
Trip Report
Emergency Response Sampling Event

Yeager Impoundment Site
Amwell Township, Washington County, Pennsylvania

TDD: TL01-11-07-004

Contract: EP-S3-10-04
March 13, 2012



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ACRONYM LIST

<u>Acronym</u>	<u>Definition</u>
BTAG	Biological Technical Assistance Group
EPA	United States Environmental Protection Agency
µg/l	Micrograms per liter
MCL	Maximum Contaminant Level
OASQA	Office of Analytical Services Quality Assurance
OSC	On-Scene Coordinator
ppb	parts per billion
QA	Quality Assurance
QC	Quality Control
TDD	Technical Direction Document

1.0 INTRODUCTION

1.1 Scope of Work and Purpose

On July 15th, 2011, EPA Region III On-Scene Coordinator (OSC) Debbie Lindsey tasked TechLaw, Inc. (TechLaw) to perform an assessment/sampling at the Yeager Impoundment Site (Site) located on McAdams Road, Amwell Township, Washington County, Pennsylvania. The purpose of the assessment/sampling was to provide information to EPA regarding accumulated surface runoff water located at the base of the Yeager Impoundment and to determine the possible presence of contaminants. Sampling activities included the collection of water samples from accumulated surface water in the intermittent stream(s). These sampling activities were conducted under a Technical Direction Document (TDD) Number TL01-11-07-004, Contract Number EP-S3-10-04.

2.0 SITE DESCRIPTION/BACKGROUND

2.1 Site Description

The Site involves a Marcellus shale fracturing (fracking) fluid impoundment and the potential release of such, resulting in contaminated water in a low lying area east of the impoundment in Amwell Township, PA. The approximate Site location is 40° 05.434' north latitude and 80° 13.523' west longitude and is depicted in Figure 1, Site Location Map. The Site lies within an area that is rural farmland and, as a result, is somewhat remote (see Figure 2, Site Map).

2.2 Background

The sampling event was in response to a notification received through the National Response Center (NRC), Report #982515, of potentially contaminated accumulated surface water in intermittent streams near the Marcellus Shale Yeager Impoundment facility which then leads off-site to a nearby creek. Once notified by EPA, TechLaw took the necessary steps to procure analytical services, sampling equipment, and other equipment (most notably Nomex™ coveralls) necessary to conduct the assessment and collect the desired samples. The coveralls were required for access to the facility and were required to be worn while on facility property.

EPA obtained access agreements from the necessary property owners in order to collect the surface water samples. Range Resources provided access in order for EPA to traverse the Yeager Impoundment's operational areas to gain access to the sampling area. Access and sampling were also coordinated with MarkWest Liberty Midstream and Resources LLC which maintain an easement with the current property owner for the portion of the property where sampling was scheduled to take place.

Prior to mobilization to the Site for sample collection, (b) (4) (TechLaw) and Debbie Lindsey (OSC) met with a representative from Range Resources in order to gain access to the sampling location to conduct a site reconnaissance. The site reconnaissance was to determine the feasibility and conditions under which the samples could be collected at the Site. The streams to be sampled were low in surface water flow at the time of the site visit. OSC Lindsey and TechLaw determined that the samples would need to be collected soon after a significant rain event in order to collect the volumes necessary for the wide array of analyses.

3.0 EMERGENCY RESPONSE SAMPLING ACTIVITIES

Sampling activities were originally initiated as an emergency response. Sampling was delayed while obtaining access agreements and further delayed due to dry weather conditions and lack of surface water in the intermittent streams. After a week of light to moderate rain, sampling activities were conducted at the Yeager Impoundment Site on September 12, 2011. Sampling activities included the collection of two (a sample and a duplicate) surface water samples at the confluence of two streams downhill and to the east of the impoundment.

3.1 Surface Water Sampling

A surface water sample (SW-01) and a duplicate (SW-02) were collected from one location (40° 05.434' north latitude and 80° 13.523' west longitude). The sample location point was selected due to its proximity in regard to the confluence of the two streams and the volume of water available at that point. In order to facilitate sampling, a depression at that point was deepened utilizing a shovel. Approximately 45 minutes elapsed from the time the sample point was deepened and the time the samples were collected in order to flush out silt and sediment. To collect the sample, an eight (8) ounce jar was utilized to transfer the water to the appropriate sample containers. Collection of sample SW-01 began at 11:20 AM and collection was completed by 12:00 PM. The amount of time required for sample collection was impacted by the wide range of analyses and volumes required for proper sample analysis. A duplicate sample (SW-02) was collected at the same time; however, the sample time of the duplicate sample was adjusted in order to obscure the fact that it was a duplicate for the laboratory.

Upon completion of the collection of samples by EPA, representatives from Mark West also collected surface water samples from the same location. The analytical parameters for the EPA samples had been provided to Mark West prior to the commencement of sampling activities.

Laboratory analytical services were procured by TechLaw due to the initial emergency response request from EPA. The samples were collected on September 12, 2011, and shipped to Test America, located in Denver, Colorado, for analysis via Federal Express. The samples were received at Test America on September 13, 2011. Test America submitted their analytical report on October 5, 2011. A copy of this report may be found in Appendix B, Analytical and Data Validation.

Validation of the analytical data package was requested of and performed by the Region III Environmental Services Assistance Team (ESAT) contractor Lockheed Martin Environmental Services, Ft. Meade, MD. The ESAT validation reports may be found in Appendix B, Analytical Data and Validation Reports.

4.0 ANALYTICAL RESULTS

4.1 Analytical Methodology and Results for Organic Constituents

The samples were analyzed by several different methods for organic constituents. The methodologies included the following:

Method	Analytes	Table of Results
8260B	Volatile organic compounds	Table 1
8270C	Semi-volatile organic compounds	Table 2
8270C SIM	Polycyclic aromatic hydrocarbons	Table 3
RSK-175	Dissolved gases	Table 4
8011	EDB and EDC	Table 4
8015B	Diesel range only compounds	Table 4

Only methane (RSK-175 analysis) was found to be present in the sample and the duplicate at a concentration of 3.1 micrograms per liter ($\mu\text{g/l}$) or parts per billion (ppb). The dissolved methane gas identified in the surface water sample should not pose a threat for fire or explosion since it is able to evaporate. No other analytes were found to be present above the method detection limit (MDL). A summary of the results of these analyses, as well as their associated MDL can be found in Table 1 through Table 4.

4.2 Analytical Methodology and Results for Inorganic Constituents

The samples were also analyzed by several different inorganic methods for various inorganic constituents. The methodologies included the following:

Method	Analytes
6010B	Metals
6020	Metals
7470A	Mercury
SM 2340B	Total hardness
1664A	HEM
300.0	Bromide, chloride, and sulfate
365.1	Total phosphate
SM 2540C	Total dissolved solids
SM 2540D	Total suspended solids
SM2320 B	Alkalinity and bicarbonate alkalinity
180.1	Turbidity
SM 2510B	Specific conductance

Summaries of the results for these analyses can be found in Table 5, Inorganic Analytical Results. The results of the inorganic analyses were compared to EPA Region III Biological Technical Assistance Group (BTAG) Freshwater Screening Benchmarks (July

2006) to determine if concentrations present at the site might present a risk to the ecological receptors in the area. It was determined that the concentrations, in most cases, did not exceed the BTAG screening levels. There were elevated levels of aluminum, iron, barium, and manganese which are naturally occurring elements. However, it should be noted that these levels are not regulatory in nature and are more appropriately used as screening values.

The results of the inorganic analyses were also compared to the Maximum Contaminant Levels (MCLs) under EPA's National Primary Drinking Water Standards to determine if concentrations present at the site might pose a risk to public health. The concentrations measured in the samples did not exceed any of the listed MCLs. Drinking water standards were used in this evaluation since there are no available surface water standards to use to assess risks to public health.

4.3 Analytical Methodology and Results for Radionuclides

The samples were also analyzed for the presence of radionuclides. The analyses included Gamma Spec, Gross Alpha, Gross Beta, Total Alpha Radium (Ra), and Ra-228.

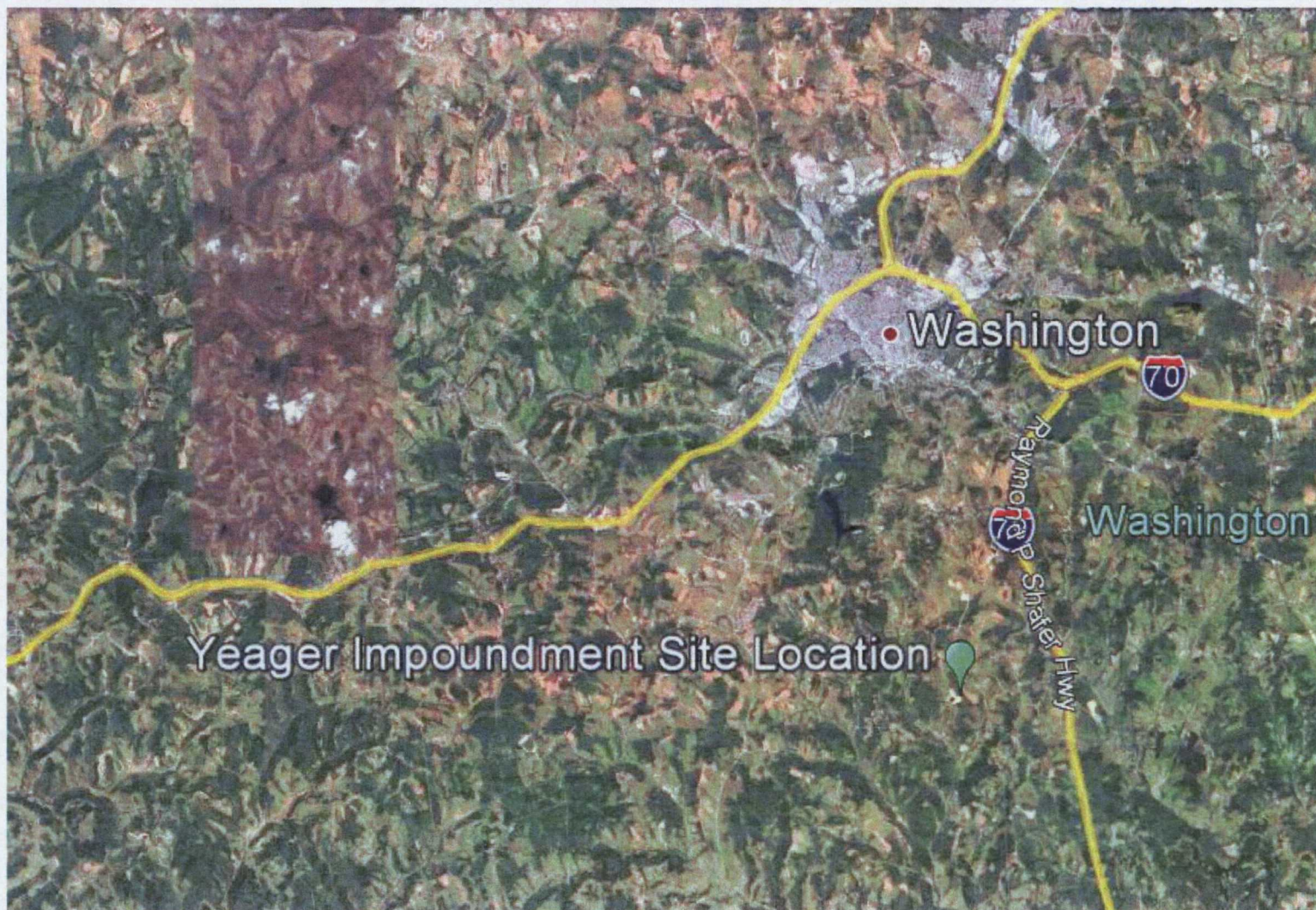
Method	Analytes
EPA 901.1	Gamma Spec (Cs-137)
EPA 900	Gross Alpha & Beta
EPA 903	Total Alpha Radium
EPA904	Radium -228

A summary of the results of these analyses is provided in Table 6, Radionuclide Analytical Results. The results of the radionuclides analysis were compared to the Maximum Contaminant Levels (MCLs) under EPA's National Primary Drinking Water Standards to determine if concentrations present at the site might pose a risk to public health. The concentrations measured in the samples did not exceed any of the listed MCLs. Drinking water standards were used in this evaluation since there are no available surface water standards to use to assess risks to public health.

5.0 FUTURE ACTIONS

After a review of the analytical data collected from the sampling event on September 12, 2011, the results do not show levels that exceed EPA drinking water standards or ecological risk screening levels. No future action is warranted at this time.

FIGURES



TDD No. TL01-11-07-004
EPA/START Contract No. EP-S3-10-04

Figure 1: Site Location Map
Yeager Impoundment Site
Amwell Township, Washington County,
Pennsylvania

Map by: DJI

Date: 1/9/12

Not to scale



Source: Google Earth



TDD No. TL01-11-07-004
EPA/START Contract No. EP-S3-10-04

Figure 2: Site Map
Yeager Impoundment Site
Amwell Township, Washington County,
Pennsylvania

Map by: DJI

Date: 1/9/12

Not to scale



Source: Google Earth

Table 1
Yeager Impoundment Site
Volatile Organic Compound Analytical Results

Sample ID	SW-01		SW-02			
Sample Date	9/12/2011	MDL	9/12/2011	MDL	Units	Method
1,1,1-Trichloroethane	ND	0.50	ND	0.50	µg/l	8260B
1,1,2,2-Tetrachloroethane	ND	0.18	ND	0.18	µg/l	8260B
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	0.50	ND	0.50	µg/l	8260B
1,1,2-Trichloroethane	ND	0.13	ND	0.13	µg/l	8260B
1,1-Dichloroethane	ND	0.25	ND	0.25	µg/l	8260B
1,1-Dichloroethene	ND	0.11	ND	0.11	µg/l	8260B
1,2,3-Trichlorobenzene	ND	0.35	ND	0.35	µg/l	8260B
1,2,4-Trichlorobenzene	ND	0.25	ND	0.25	µg/l	8260B
1,2-Dichlorobenzene	ND	0.21	ND	0.21	µg/l	8260B
1,2-Dichloroethane	ND	0.10	ND	0.10	µg/l	8260B
1,2-Dichloropropane	ND	0.13	ND	0.13	µg/l	8260B
1,3-Dichlorobenzene	ND	0.25	ND	0.25	µg/l	8260B
1,4-Dichlorobenzene	ND	0.28	ND	0.28	µg/l	8260B
2-Butanone	ND	1.0	ND	1.0	µg/l	8260B
2-Hexanone	ND	1.0	ND	1.0	µg/l	8260B
4-Methyl-2-pentanone	ND	1.0	ND	1.0	µg/l	8260B
Acetone	ND	5.0	ND	5.0	µg/l	8260B
Benzene	ND	0.25	ND	0.25	µg/l	8260B
Bromochloromethane	ND	0.14	ND	0.14	µg/l	8260B
Bromoform	ND	0.50	ND	0.50	µg/l	8260B
Bromomethane	UJ	0.80	UJ	0.80	µg/l	8260B
Carbon disulfide	ND	0.60	ND	0.60	µg/l	8260B
Carbon tetrachloride	ND	0.50	ND	0.50	µg/l	8260B
Chlorobenzene	ND	0.25	ND	0.25	µg/l	8260B
Chlorodibromomethane	ND	0.10	ND	0.10	µg/l	8260B
Chloroethane	ND	1.0	ND	1.0	µg/l	8260B
Chloroform	ND	0.14	ND	0.14	µg/l	8260B
Chloromethane	ND	0.33	ND	0.33	µg/l	8260B
cis-1,2-Dichloroethene	ND	0.15	ND	0.15	µg/l	8260B
cis-1,3-Dichloropropene	ND	0.11	ND	0.11	µg/l	8260B
Cyclohexane	ND	0.25	ND	0.25	µg/l	8260B
Dichlorobromomethane	ND	0.25	ND	0.25	µg/l	8260B
Dichlorodifluoromethane	ND	0.25	ND	0.25	µg/l	8260B
Ethylbenzene	ND	0.11	ND	0.11	µg/l	8260B
Isopropylbenzene	ND	0.10	ND	0.10	µg/l	8260B
Methyl acetate	ND	0.19	ND	0.19	µg/l	8260B
Methyl tert-butyl ether	ND	0.20	ND	0.20	µg/l	8260B
Methylcyclohexane	ND	0.10	ND	0.10	µg/l	8260B
Methylene chloride	ND	1.0	ND	1.0	µg/l	8260B
m,p-Xylene	ND	0.20	ND	0.20	µg/l	8260B
o-Xylene	ND	0.25	ND	0.25	µg/l	8260B

Table 1
Yeager Impoundment Site
Volatile Organic Compound Analytical Results

Sample ID	SW-01		SW-02			
Sample Date	9/12/2011	MDL	9/12/2011	MDL	Units	Method
Styrene	ND	0.11	ND	0.11	µg/l	8260B
Terachloroethene	ND	0.15	ND	0.15	µg/l	8260B
Toluene	ND	0.33	ND	0.33	µg/l	8260B
<i>trans</i> -1,2-Dichloroethene	ND	0.20	ND	0.20	µg/l	8260B
<i>trans</i> -1,3-Dichloropropene	ND	0.21	ND	0.21	µg/l	8260B
Trichloroethene	ND	0.13	ND	0.13	µg/l	8260B
Trichlorofluoromethane	ND	0.25	ND	0.25	µg/l	8260B
Vinyl chloride	ND	0.18	ND	0.18	µg/l	8260B
Total xylenes	ND	0.20	ND	0.20	µg/l	8260B

Notes:

MDL = Method Detection Limit

UJ = not detected, quantitation limit may be inaccurate or imprecise

ND = not detected above detection limits

µg/l = micrograms per liter or parts per billion (ppb)

Table 2						
Yeager Impoundment Site						
Semivolatile Organic Compound (GC/MS) Analytical Results						
Sample ID	SW-01		SW-02			
Sample Date	9/12/2011	MDL	9/12/2011	MDL	Units	Method
Acenaphthene	ND	0.27	ND	0.27	µg/l	8270C
Acenaphthylene	ND	0.47	ND	0.47	µg/l	8270C
Acetophenone	ND	0.23	ND	0.23	µg/l	8270C
Anthracene	ND	0.40	ND	0.4	µg/l	8270C
Atrazine	ND	0.70	ND	0.7	µg/l	8270C
Benzaldehyde	ND	1.9	ND	1.9	µg/l	8270C
Benzo(a)anthracene	ND	0.33	ND	0.34	µg/l	8270C
Benzo(a)pyrene	ND	0.30	ND	0.30	µg/l	8270C
Benzo(b)fluoranthene	ND	0.51	ND	0.51	µg/l	8270C
Benzo(g,h,i)perylene	ND	0.48	ND	0.48	µg/l	8270C
Benzo(k)fluoranthene	ND	0.44	ND	0.44	µg/l	8270C
1,1'-Biphenyl	ND	1.7	ND	1.7	µg/l	8270C
Bis(2-chloroethoxy)methane	ND	0.93	ND	0.93	µg/l	8270C
Bis(2-chloroethyl)ether	ND	0.39	ND	0.39	µg/l	8270C
Bis(2-ethylhexyl)phthalate	ND	0.54	ND	0.54	µg/l	8270C
4-Bromophenyl phenyl ether	ND	0.41	ND	0.41	µg/l	8270C
Butyl benzyl phthalate	ND	0.96	ND	0.96	µg/l	8270C
Caprolactam	ND	4.8	ND	4.8	µg/l	8270C
Carbazole	ND	0.41	ND	0.41	µg/l	8270C
4-Chloroaniline	ND	2.0	ND	2.1	µg/l	8270C
4-Chloro-3-methylphenol	ND	2.3	ND	2.3	µg/l	8270C
2-Chloronaphthalene	ND	0.25	ND	0.25	µg/l	8270C
2-Chlorophenol	ND	1.9	ND	1.9	µg/l	8270C
4-Chlorophenyl phenyl ether	ND	1.6	ND	1.6	µg/l	8270C
Chrysene	ND	0.52	ND	0.52	µg/l	8270C
Dibenz(a,h)anthracene	ND	0.49	ND	0.49	µg/l	8270C
Dibenzofuran	ND	0.28	ND	0.28	µg/l	8270C
3,3'-Dichlorobenzidine	ND	1.9	ND	1.9	µg/l	8270C
2,4-Dichlorophenol	ND	0.61	ND	0.62	µg/l	8270C
Diethyl phthalate	ND	0.36	ND	0.37	µg/l	8270C
2,4-Dimethylphenol	ND	0.55	ND	0.56	µg/l	8270C
Dimethyl phthalate	ND	0.20	ND	0.20	µg/l	8270C
Di-n-butyl phthalate	ND	1.1	ND	1.1	µg/l	8270C
4,6-Dinitro-2-methylphenol	ND	3.8	ND	3.8	µg/l	8270C
2,4-Dinitrophenol	ND	9.6	ND	9.6	µg/l	8270C
2,4-Dinitrotoluene	ND	1.6	ND	1.6	µg/l	8270C
2,6-Dinitrotoluene	ND	1.8	ND	1.8	µg/l	8270C
Di-n-octyl phthalate	ND	0.33	ND	0.34	µg/l	8270C
1,4-Dioxane	ND	1.6	ND	1.6	µg/l	8270C
Fluoranthene	ND	0.19	ND	0.19	µg/l	8270C
Fluorene	ND	0.30	ND	0.30	µg/l	8270C

Table 2						
Yeager Impoundment Site						
Semivolatile Organic Compound (GC/MS) Analytical Results						
Sample ID	SW-01	MDL	SW-02	MDL	Units	Method
Sample Date	9/12/2011		9/12/2011			
Hexachlorobenzene	ND	0.63	ND	0.63	µg/l	8270C
Hexachlorobutadiene	ND	3.2	ND	3.2	µg/l	8270C
Hexachlorocyclopentadiene	ND	1.5	ND	1.5	µg/l	8270C
Hexachloroethane	ND	2.0	ND	2.0	µg/l	8270C
Indeno(1,2,3-cd)pyrene	ND	0.62	ND	0.63	µg/l	8270C
Isophorone	ND	0.20	ND	0.20	µg/l	8270C
2-Methylnaphthalene	ND	0.28	ND	0.28	µg/l	8270C
2-Methylphenol	ND	0.94	ND	0.94	µg/l	8270C
4-Methylphenol	ND	0.24	ND	0.24	µg/l	8270C
Naphthalene	ND	0.28	ND	0.28	µg/l	8270C
2-Nitroaniline	ND	1.7	ND	1.7	µg/l	8270C
3-Nitroaniline	ND	1.9	ND	1.9	µg/l	8270C
4-Nitroaniline	ND	1.9	ND	1.9	µg/l	8270C
Nitrobenzene	ND	0.77	ND	0.78	µg/l	8270C
2-Nitrophenol	ND	0.37	ND	0.38	µg/l	8270C
4-Nitrophenol	ND	1.2	ND	1.2	µg/l	8270C
N-Nitrosodi-n-propylamine	ND	0.33	ND	0.34	µg/l	8270C
n-Nitrosodiphenylamine (as diphenylamine)	ND	0.42	ND	0.42	µg/l	8270C
2,2'-Oxybis(1-chloropropane)	ND	0.27	ND	0.27	µg/l	8270C
Pentachlorophenol	ND	19	ND	19	µg/l	8270C
Phenanthrene	ND	0.25	ND	0.25	µg/l	8270C
Phenol	ND	1.9	ND	1.9	µg/l	8270C
1,2,4,5-Tetrachlorobenzene	ND	1.7	ND	1.7	µg/l	8270C
2,3,4,6-Tetrachlorophenol	ND	1.9	ND	1.9	µg/l	8270C
2,4,5-Trichlorophenol	ND	0.43	ND	0.43	µg/l	8270C
2,4,6-Trichlorophenol	ND	0.28	ND	0.28	µg/l	8270C
Notes:						
ND = not detected above detection limits						
MDL = method detection limit						
µg/l = micrograms per liter or parts per billion (ppb)						

Table 3						
Yeager Impoundment Site						
Semivolatile Organic Compound (GC/MS SIM) Analytical Results						
Sample ID	SW-01		SW-02			
Sample Date	9/12/2011	MDL	9/12/2011	MDL	Units	Method
Benzo(b)fluoranthene	ND	3.3	ND	3.3	ng/l	8270C SIM
Benzo(a)pyrene	ND	4.9	ND	5.0	ng/l	8270C SIM
Benzo(a)anthracene	ND	3.1	ND	3.1	ng/l	8270C SIM
Benzo(k)fluoranthene	ND	4.8	ND	4.9	ng/l	8270C SIM
Benzo(g,h,i)perylene	ND	3.4	ND	3.4	ng/l	8270C SIM
Phenanthrene	ND	9.3	ND	9.4	ng/l	8270C SIM
Anthracene	ND	14	ND	14	ng/l	8270C SIM
Dibenz(a,h)anthracene	ND	4.6	ND	4.7	ng/l	8270C SIM
Chrysene	ND	3.1	ND	3.1	ng/l	8270C SIM
Acenaphthene	ND	10	ND	10	ng/l	8270C SIM
Acenaphthylene	ND	9.5	ND	9.6	ng/l	8270C SIM
Fluoranthene	ND	4.3	ND	4.4	ng/l	8270C SIM
Fluorene	ND	18	ND	18	ng/l	8270C SIM
Pyrene	ND	7.7	ND	7.8	ng/l	8270C SIM
Indeno(1,2,3-cd)pyrene	ND	14	ND	14	ng/l	8270C SIM
1-Methylnaphthalene	ND	5.4	ND	5.5	ng/l	8270C SIM
2-Methylnaphthalene	ND	4.9	ND	5.0	ng/l	8270C SIM
Naphthalene	ND	5.1	ND	5.1	ng/l	8270C SIM
Notes:						
ND = not detected above detection limits						
MDL = method detection limit						
ng/l = nanograms per liter or parts per trillion (ppt)						

Table 4 Yeager Impoundment Site Miscellaneous Organic Compounds Analytical Results						
Sample ID	SW-01		SW-02		Units	Method
Sample Date	9/12/11	MDL	9/12/11	MDL		
Ethane	ND	0.55	ND	0.55	µg/l	RSK-175
Ethylene	ND	0.5	ND	0.5	µg/l	RSK-175
Methane	3.1	0.29	3.1	0.29	µg/l	RSK-175
1,2-Dibromo-3-chloropropane	ND	0.0032	UJ	0.0033	µg/l	8011
1,2-Dibromomethane	ND	0.0078	UJ	0.0078	µg/l	8011
DRO	ND	0.031	ND	0.031	mg/l	8015B
Notes: ND = not detected MDL = method detection limit DRO = diesel range only UJ = not detected, quantitation limit may be inaccurate or imprecise µg/l = micrograms per liter or parts per billion (ppb) mg/l = milligrams per liter or parts per million (ppm)						

Table 5
Yeager Impoundment Site
Inorganic Analytical Results

Sample ID	SW-01	SW-02	Units	Method	BTAG Screening Value (µg/l)	EPA MCLs (µg/l)
Sample Date	9/12/2011	9/12/2011				
Aluminum	340	500	µg/l	6010B	87	-----
Calcium	59000	58000	µg/l	6010B	116000	-----
Iron	610	830	µg/l	6010B	300	-----
Lithium	ND	ND	µg/l	6010B	14	-----
Magnesium	8100	8000	µg/l	6010B	82000	-----
Potassium	1800 J	2000 J	µg/l	6010B	53000	-----
Sodium	6200	6200	µg/l	6010B	680000	-----
Strontium	170	160	µg/l	6010B	1500	-----
Mercury	ND	0.030 B	µg/l	7470A	0.026	2
Antimony	0.14 B	ND	µg/l	6020	30	6
Arsenic	1.4 J	0.90 J	µg/l	6020	5	10
Barium	50	46	µg/l	6020	4	2000
Beryllium	ND	ND	µg/l	6020	0.66	4
Cadmium	ND	0.050 J	µg/l	6020	0.25	5
Chromium	1.2 J	0.72	µg/l	6020	85	100
Cobalt	1.5	1.1	µg/l	6020	23	-----
Copper	1.4 J	1.2 J	µg/l	6020	9	1300
Lead	0.81 J	0.46 J	µg/l	6020	2.5	15
Manganese	680	590	µg/l	6020	120	-----
Nickel	1.7 J	1.3 J	µg/l	6020	52	-----
Selenium	ND	ND	µg/l	6020	1	50
Silver	0.020 B	ND	µg/l	6020	3.2	-----
Thallium	0.021 B	0.031 B	µg/l	6020	0.8	2
Uranium	0.15 J	0.13 J	µg/l	6020	2.6	30
Vanadium	1.6 J	0.74 J	µg/l	6020	20	-----
Zinc	4.6 J	3.6 J	µg/l	6020	120	-----

Notes:

µg/l = micrograms per liter or parts per billion (ppb)

mg/l = milligrams per liter or parts per million (ppm)

J = result is less than the reporting limit but greater than or equal to the MDL and the concentration is an approximate value

B = compound was found in the blank and sample

NTU = nephelometric turbidity unit

umhos/cm = micromhos per centimeter

----- = no screening value available

<p align="center">Table 5 Yeager Impoundment Site Inorganic Analytical Results</p>						
Sample ID	SW-01	SW-02	Units	Method	BTAG Screening	EPA MCLs
Sample Date	9/12/2011	9/12/2011			Value (µg/l)	(µg/l)
Total Phosphate	0.16 B	0.15 B	mg/l	365.1	----	----
HEM	1.8 B	2.4 B	mg/l	EPA 1664A	----	----
SGT-HEM	ND	ND	mg/l		----	----
Bromide	0.40	0.31	mg/l	300.0	----	----
Chloride	49	49	mg/l	300.0	230000	----
Sulfate	24	24	mg/l	300.0	----	----
Total Dissolved Solids	290	300	mg/l	SM 2540C	----	----
Total Suspended Solids	62	74	mg/l	SM 2540D	----	----
Alkalinity	120	120	mg/l	SM2320 B	----	----
Bicarbonate Alkalinity	120	120	mg/l	SM2320 B	----	----
Turbidity	29	32	NTU	180.1	----	----
Specific Conductance	430	450	umhos/cm	SM 2510B	----	----
MBAS	ND	ND	mg/l	SM 5540C	----	----
<p>Notes:</p> <p>µg/l = micrograms per liter or parts per billion (ppb)</p> <p>mg/l = milligrams per liter or parts per million (ppm)</p> <p>J = result is less than the reporting limit but greater than or equal to the MDL and the concentration is an approximate value</p> <p>B = compound was found in the blank and sample</p> <p>NTU = nephelometric turbidity unit</p> <p>umhos/cm = micromhos per centimeter</p> <p>---- = no screening value available</p>						

Table 6 Yeager Impoundment Site Radionuclide Analytical							
Sample ID	SW-01	Qual	SW-02	Qual	Units	Method	
Sample Date	9/12/2011		9/12/2011			Test America	EPA
Gamma Spec (Cs-137)	1.09 +/- 3.2	U	0.0108 +/- 3.5	U	pCi/l	RL-GAM-001	EPA 901.1
Gross Alpha	0.748 +/- 1.3	U	1.17 +/- 1.4	U	pCi/l	RL-GPC-001	EPA 900
Gross Beta	3.28 +/- 1.7	J	3.04 +/- 1.6	J	pCi/l	RL-GPC-001	EPA 900
Total Alpha Radium	-0.00475 +/- 0.0392	U	0.0298 +/- 0.09	U	pCi/l	RL-RA-002	EPA 903
Radium-228	0.0632 +/- 0.21	U	0.588 +/- 0.27	J	pCi/l	RL-RA-001	EPA 904
Notes: Cs = cesium E = exponential J = the radionuclide is considered to be present, but the result may be inaccurate or imprecise pCi/l = picocuries per liter Qual = data qualifier U = the radionuclide is not considered to be present in the sample							

APPENDIX B

**Yeager Impoundment Site
Amwell Township, Washington County, Pennsylvania
TDD No. TL01-11-07-004**



7/14/2011

View northwest from the location of the streams downgradient of the impoundment which would be located to the left of the photo.



7/14/2011

One of the intermittent streams leading down from the impoundment. The discoloration is assumed to be decaying organic matter (straw).



7/14/2011

Photograph of standing water downgradient from the impoundment.



7/14/2011

One of the streams lying downgradient of the impoundment.

**Yeager Impoundment Site
Amwell Township, Washington County, Pennsylvania
TDD No. TL01-11-07-004**



7/14/2011

Accumulated surface water downgradient from the impoundment.



7/14/2011

A view of one of the streams (center) leading upgradient to the location of the impoundment.



8/15/2011

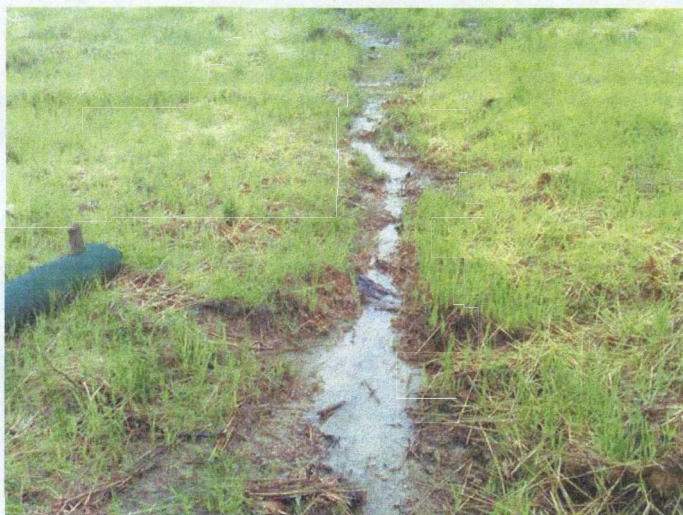
Standing surface water downgradient of the impoundment following a rain event at the site. Photo taken during a reconnaissance of the site.



8/15/2011

One of the various streams leading up to the impoundment.

**Yeager Impoundment Site
Amwell Township, Washington County, Pennsylvania
TDD No. TL01-11-07-004**



8/15/2011

Another of the various streams leading up to the impoundment.



8/15/2011

Flowing surface water at one of the streams downgradient of the impoundment.



8/15/2011

One of the various streams leading up to the impoundment.